

LUXATIO ACROMIO-CLAVICULARIS SUPRASPINATA

By

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In the complete dislocation of the acromio-clavicular joint with avulsion of the coraco-clavicular ligaments the scapula loses its suspension from the clavicle and sinks down by the weight of the arm. As a consequence the lateral end of the clavicle is displaced upwards, and a little backwards, in relation to the acromion. In rare cases, however, the dislocation is subacromial, subcoracoidal, or backwards above the spine of the scapula (Eliason, in Nelson Loose-Leaf Surgery) as in the case to be reported here. This latter dislocation can be produced by a violent compression of the shoulders from side to side, probably in such a way that the side which is dislocated is pressed forward. The condition is presumably the first stage in the "simultaneous" or "total" dislocation of the clavicle with both a sternal and an acromial luxation (Böhm 1926, Sommer 1928). The rarity of these two types may be ascribed to the fact that the compression almost invariably brings about a fracture of the clavicle or, where it has the proper direction, may act with such a force as to cause immediate death through thoracic lesions.

Case note: K. H., V. 1308/55. A girl, aged nine, was jammed between a lorry and a wall. The lorry came from behind the right side of the child, and while her left shoulder was pressed against the wall her right shoulder was pushed inwards and twisted forward by the body of the car. When the driver got stopped, the girl was stuck, and the lorry had to be lifted aside to free the child.

On admission she complained of pain in the right side of her chest. Her respiration was shallow and rapid, and a great subcutaneous emphysema was present and quickly spreading. Roentgen examination of the chest showed a rather small bilateral pneumothorax and a linear clearness along the left border of the heart indicating a mediastinal emphysema. There were no visible fractures of the ribs.

The shoulder breadth was reduced on the right side, abrasions were seen on the back of the shoulder, and the lateral end of the clavicle projected directly under the skin in the suprascapular fossa level with the acromion (Figs. 1 and 2).



Fig. 1.

One week after the accident. Note the projecting end of the clavicle.
(The subcutaneous emphysema has disappeared.)



Fig. 2.

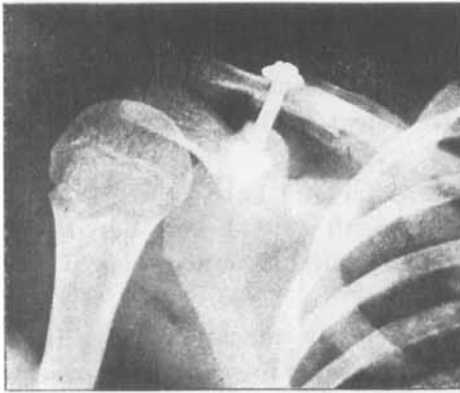
Axial view of luxatio acromio-clavicularis supraspinata.
(The lateral end of the clavicle has been outlined.)

The shortness of breathing disappeared in a few days and when the lungs expanded and the subcutaneous emphysema went an attempt at reposition was made eleven days after the accident. In spite of deep anesthesia combined with curasit the clavicle could not be moved and recourse was had therefore to open reduction and osteosynthesis. The end of the clavicle was found to penetrate the fibres of the trapezius, and the muscle had to be divided before the clavicle could be returned to its normal position. The whole of the lateral third of the clavicle was devoid of periosteum, the coraco-clavicular ligaments were torn, and small fragments were avulsed from the end of the clavicle. The reduction could be maintained only by a heavy pressure on the clavicle when the arm was forced upwards. For the purpose of holding the scapula to the clavicle a Vitallium Barr bolt was employed having two washers and a stop nut with a nylon collar of the type used for malleolar fractures (Austen's Vitallium catalogue no. 6354; however, the bolt used is fully threaded, and before the operation is cut to a suitable length). The coracoid process was exposed by a small incision, and the bolt was passed vertically through the clavicle and the base of the coracoid process, both of which were drilled to a larger diameter than that of the bolt. The end of the bolt was laid bare in the muscle-fibres underneath the coracoid process, the stop nut was applied and the bolt tightened up until the clavicle was on a level with the acromion. Either end of the bolt was provided with a washer beforehand. Finally the split trapezius and deltoid muscles and the skin were sutured with silk, and a Jones' brachio-clavicular strapping was applied.

The postoperative course was uneventful. On discharge ten days after the operation the strapping was replaced by a sling, and active exercises were prescribed. On reexamination seven weeks later there were no complaints, the shoulder-outlines were normal (Figs. 3 and 4), and the arm could be freely moved in all directions. Roentgen examination revealed a normal position. Bone formation was demonstrable round the clavicle and along the bolt (Figs. 5 and 6).

*Fig. 3.**Fig. 4.*

Nine days after open reduction and osteosynthesis acromio-clavicularis.

*Fig. 5.**Fig. 6.*

Seven weeks after osteosynthesis with a Vitallium bolt.

Epicrise: A girl, aged nine, was jammed between a lorry and a wall and sustained a bilateral pneumothorax, subcutaneous and mediastinal emphysema and an acromio-clavicular dislocation with *backwards* displacement of the lateral end of the clavicle. This jutted out between the fibres of the trapezius muscle right above the spine of the scapula and was immovable. An open reduction was carried out and was maintained by connecting the clavicle with the coracoid process by means of a Vitallium bolt provided with two washers and a stop nut with a nylon collar. The anatomical as well as the functional result was completely satisfactory.

DISCUSSION

This type of dislocation is extremely rare. In 1928 Sommer referred to five cases and in only three of these was a closed reduction impracticable. This held good of the last case from 1909 (Hintermayer) which is nearly identical with the present one.

A driver walking besides his carriage was jammed between the latter and a wall. Getting his right shoulder stuck he was revolved by the carriage and sustained a right-sided dislocation. At the open reduction the end of the clavicle was found just under the skin between the fibres of the trapezius.

Reports of any later cases could not be traced. The one related by Lauber (1935) seems dubious, as the backwards dislocation was slight and easy to reduce. It should be pointed out that some backwards displacement of the clavicle is present in the majority of acromioclavicular separations (Howard 1939). The supraspinous dislocation proper must be characterized by the placement of the end of the clavicle right above the spine of the scapula jutting out through the trapezius and held immovably firm by the latter.

The main reason for reporting the present case, however, is the method of osteosynthesis adopted which is deemed to answer its purpose also in the case of operative treatment of the ordinary acromioclavicular dislocation.

The technique is a modification—as far as I know, not previously used—of the original method of Bosworth (1941) and Vere-Hodge (1946), which consisted in fixing the clavicle to the acromion with a screw.

The reports found in the literature clearly indicate that the functionally correct principle in surgical intervention for acromioclavicular separation is to reestablish the connection between the scapula and the clavicle by replacing the torn coraco-clavicular ligaments. The methods which involve the use of a steel wire above the clavicle and below the coracoid process (Watkins 1925) or a free fascial graft (Bunnel 1928) make it difficult to obtain the necessary tightening of the material, and this is liable to break or stretch during the period of healing in the first couple of months after the operation.

A Bosworth lag-screw is easier to put in position and to tighten properly. As an objection to this method Urist (1946) states that it presents a hindrance to the rotation of the clavicle on its long axis during the abduction of the shoulder. However, observations made by Kennedy & Cameron (1954) show that this rotation is attended by a synchronous rotation of the scapula which only in elderly persons

(over the age of fifty) might be incomplete and restrict the final abduction of the shoulder upon a coraco-clavicular fixation by means of a screw.

Still, the mobility between the clavicle and the scapula seems to make it hazardous to rely upon the grip of the screw in the coracoid process without postoperative immobilisation. Bosworth does so, considering this to be a definite advantage of the method, but out of his own cases numbering seventeen (1948) the screw worked loose in two and broke in another two. By the use of a bolt with a stop nut the connection cannot be disrupted. An important point, however, is probably to allow for some degree of mobility between the clavicle and the coracoid process, and this is achieved by making the drill holes in *both* of them larger than the bolt. This necessitates the use of a stop nut provided with a nylon collar, lest the nut should unscrew itself.

In the surgical methods which according to Gurd and Mumford involve an excision of the outer end of the clavicle a less solid connection between the clavicle and the coracoid process may be relied upon (Røjel 1955). An excision, however, is stated to cause some weakness in the abduction of the shoulder (Urist, Kennedy & Cameron), and after all, any surgeon will hesitate to remove the end of the clavicle in a growing child.

In the present case the roentgenograms seven weeks after the operation reveal abundant calcification round the clavicle and along the coraco-clavicular ligaments. This is a common finding after conservatively treated acromio-clavicular dislocations (Krieger-Lassen 1933) as well as after those treated surgically. Thus, in four of Bosworth's cases a complete bridge of callus was present, yet with a visible pseudarthrosis in two of them. This luxurious bone formation does not seem to restrict the shoulder movements (Kennedy & Cameron) except perhaps in those few cases which present a complete synostosis (Urist).

SUMMARY

The different types of acromio-clavicular dislocations are mentioned and a report is made of one case of the very rare backwards displacement of the end of the clavicle above the spine of the scapula. An open reduction and retention of the coracoid process to the clavicle was performed by means of a Vitallium bolt with a stop nut provided with a nylon collar. The reason for this modification of the Bosworth lag-screw technique is founded on the many methods reported for operative treatment of acromio-clavicular separations. The author's method

seems equally justified in case surgery is required for the ordinary supra-acromial dislocation.

RESUME

Les différents types de dislocations acromio-claviculaires sont mentionnées et il est rendu compte d'un cas très rare de déplacement en arrière de la clavicule au-dessus de l'apophyse scapulaire. Une réduction ouverte et une rétention du processus coracoïdal vers la clavicule a été pratiquée au moyen d'un boulon de vitalium avec un écrou d'arrêt muni d'un collier de nylon.

La raison de la modification de la technique de Bosworth a été trouvée dans les nombreuses méthodes décrites pour le traitement opératoire des séparations acromio-claviculaires. La méthode de l'auteur paraît également justifiée dans les cas où une intervention chirurgicale est nécessaire pour le traitement de la dislocation supra-acromiale ordinaire.

ZUSAMMENFASSUNG

Die verschiedenen Typen der akromio-clavikular Luxation werden erwähnt und es wird über einen Fall der sehr seltenen rückwärtigen Luxation des Endes der clavicula über die spina scapulæ berichtet. Offene Reposition und Fixierung des processus coracoideus an das Schlüsselbein wurde mittels eines Vitalliumbolzens, der mit einer Schraubenmutter mit Nylonkragen versehen war, ausgeführt. Der Grund für diese Veränderung der Schraubentechnik nach Bosworth liegt in den vielen veröffentlichten Methoden zur Behandlung der akromio-clavikular Ruptur. Die Methode des Verfassers scheint ebenso berechtigt zu sein, wenn in Fällen gewöhnlicher supra-akromialer Luxation ein operativer Eingriff benötigt wird.

BIBLIOGRAPHY

- Bosworth, B. M.*: Acromioclavicular Separation: A New Method of Repair. *Surg., Gynec. & Obst.* 1941: 73, 866.
 — Acromioclavicular Dislocation. End-Results of Screw Suspension Treatment. *Ann. Surg.* 1948: 127, 98.
Bunnel, S.: Fascial Graft for Dislocation of Acromioclavicular Joint. *Surg., Gynec. & Obst.* 1928: 46, 563.
Böhm, F.: Zwei Fälle von Totalluxation der Clavicula. *Deutsche Ztschr. f. Chir.* 1926: 196, 307.
Eliason, E. L. in *Nelson New Loose-Leaf Surgery*. Vol. III, p. 200. Thomas Nelson & Sons, New York.
Hintermayer, F. X.: Ein Fall von Luxatio claviculae supraspinata. *Inaug. Dissert.* C. Wolf & Sohn, München. 1909.

- Howard, N. J.*: Acromio-clavicular and Sterno-clavicular Joint Injuries. *Am. J. Surg.* 1939: 46, 284.
- Kennedy, J. C. & Cameron, H.*: Complete Dislocation of the Acromio-Clavicular Joint. *J. Bone & Joint Surg.* 1954: 36 B, 202.
- Krieger-Lassen, H.*: Om Luxatio Acromioclavicularis. *Hosp.-t.* 1933: 76, 1196.
- Lauber, H. J.*: Zur Behandlung seltener Schlüsselbeinverrenkungen. *Der Chirurg* 1935: 7, 790.
- Røjel, K.*: Operation for Luxatio Acromio-Clavicularis a.m. Gurd & Mumford. *Ugesk. f. læger* 1955: 117, 880.
- Sommer, R.*: Die traumatischen Verrenkungen der Gelenke. *Neue Deutsche Chir.* Bd. 41. Ferdinand Enke. Stuttgart. 1928, p. 81.
- Urist, M. R.*: Complete Dislocation of the Acromio-Clavicular Joint. *J. Bone & Joint Surg.* 1946: 28, 813.
- Vere-Hodge, N.*: referred to by Watson-Jones, R.: *Fractures and Joint Injuries.* Third ed., vol. II, p. 434. E. & S. Livingstone, Edinburgh. 1946.
- Watkins, J. T.*: quoted from Krieger-Lassen, H.